

6.4 DATA MANAGEMENT

Partners in WCEP are committed to collecting and sharing data, project summaries, and project analyses in a timely manner and upon request, with the understanding that any publications will be approved by those involved in the data gathering. Such data sharing is critical to the success of recovery efforts. Three WCEP informational databases compile whooping crane information used to guide the reintroduction effort including:

1. The *Whooping Crane Master Plan*, a studbook maintained by Ken Jones, Kansas State University. This genealogy of all captive and released whooping cranes guides decisions on breeding and chick release for the project.
2. A medical database maintained by ICF, containing information from all WCEP partners during all phases of the reintroduction.
3. An EMP monitoring database with GIS interface maintained by the WI DNR.

6.4.1 Database Goals and Objectives

The newly developed (2006) EMP whooping crane monitoring database is a crucial analytical tool for making informed decisions on issues of habitat quality, landowner needs, whooping crane biology and conservation, and assessment of whooping crane management and recovery goals. The database and GIS interface will enable WI DNR and USFWS staff, ICF biologists, the International Whooping Crane Recovery Team, and other WCEP partners to analyze results of reintroduction efforts systematically and efficiently as a breeding population becomes established in Wisconsin. The expected outcome is a tool for use by WI DNR policy and regional land managers, staff biologists, and WCEP biologists in assessment of whooping crane management and recovery goals.

In creating and applying this monitoring database, Wisconsin DNR has committed to 1) developing, implementing procedures, and maintaining a whooping crane monitoring database from information collected by USFWS, ICF and WI DNR biologists; 2) determining appropriate tool(s) for data access, defining and resolving problems with the application database, and training and supporting staff in use of data access tools; and 3) identifying factors limiting whooping crane populations in Wisconsin (a Species of Greatest Conservation Need).

Whooping crane data will be recorded and electronically submitted by all field staff; WI DNR staff use an electronic monitoring form available on the WI DNR server. Data can be submitted by email or phone to the Whooping Crane Coordinator or database manager (refer to Appendix 7). Information will be compiled, consistently formatted and used for the following:

1. Documenting bird location, health, behavior, habitat, and relocation needs
2. Analyzing pair formation and reproduction, behavior, and habitat use
3. Comparing release strategies and setting future population goals for Wisconsin
4. Evaluating genetic pedigree of EMP chicks produced in the wild
5. Guiding land management, land acquisition, and public use decisions
6. Conducting environmental analyses for state and federal permit issuance (i.e., power line or cell tower placement, wastewater discharge, waste spreading, and water flow regulation)
7. Preparing outreach, education, and funding proposals

Partner investment to help maintain a workable EMP database will assure compilation, exchange, extraction, and application of whooping crane data to address WCEP needs. Data compiled while observing cranes may also provide information on other wetland bird populations in Wisconsin. Further, data management and analysis will promote adaptive management strategies and refinement of the Whooping Crane Management Plan during the course of the reintroduction effort.

6.5 MONITORING STRATEGIES

USFWS biologists have coordinated monitoring activities since project inception. However a growing population of birds and limited resources necessitates increased communication and efficiency among WCEP partners. To this end, development of a long range EMP monitoring plan is under consideration. This plan would assist reintroduction efforts by identifying both priorities and a network of field personnel in Wisconsin and along the migration pathway.

Meanwhile, ground level monitoring and tracking in Wisconsin is provided by USFWS, ICF, and WI DNR staff in specially-equipped vehicles with roof-mounted antenna, or on foot using hand-held receivers. Project interns and graduate students also contribute invaluable field observations. When medical problems arise, information is sent to the WCEP Health Team, including the WI DNR wildlife veterinarian and DNR whooping crane coordinator (see Health Monitoring, Appendix 5).

6.5.1 Radio Transmitters

All EMP birds are marked with color-coded leg bands and conventional very high frequency (VHF) radio transmitters with an approximate battery life of 1.5 years. Radio transmitters are painted to match the bands. Colored leg bands on each leg provide a unique two-way identification system, one color pattern identifies the release-year cohort and the other pattern is unique to the individual. Numbered USFWS leg bands provide long-term marking of individual cranes, yielding information on longevity and some evidence of mortality and movement. Bands with transmitters are replaced opportunistically (Appendix 1).

Radio transmitters allow tracking of habitat, dispersal patterns, breeding, and survival. Tracking range depends on distance, transmission medium, and other factors. Typical tracker-to-bird ranges for fully functional transmitters may be 3 miles ground-to-ground, 15 miles air-to-ground, 30 miles ground-to-air, and over 100 miles air-to-air. Radio-marking is extended by opportunistic recapture and replacement as needed. Immediate project needs include additional radio receivers to track whooping cranes at Jasper-Pulaski Fish and Wildlife Area in Indiana and Hiwassee Wildlife Refuge in Tennessee.

6.5.2 Aerial Tracking

Aerial tracking may be provided through private aircraft donated by Windway Corporation to ICF researchers, and periodically through USFWS commercial aircraft rental. Use of rented aircraft is limited due to expense (\$110-125 per hour), scarcity of commercial planes, and limited number of Office of Aircraft Services certified pilots required by USFWS staff (currently only two such pilots in Wisconsin).

Once an EMP monitoring plan is developed, aerial tracking may be enhanced through collaboration with other monitoring programs. Wisconsin DNR Wildlife Management and Science Services staff currently use cooperative aerial monitoring strategies for

programs involving species such as the bald eagle, osprey, trumpeter swan, duck, deer and wolf monitoring programs. Aerial surveys fly seasonally and at times biweekly. Wisconsin DNR also has radio receivers for airplane mounted tracking that can pick up whooping crane transmission frequencies. Even without specific radio identification of individual birds, aerial sighting records will provide useful information to WCEP partners.

6.5.3 Satellite-monitored Radio Transmitters

Several cranes from each year's release cohort are marked with a satellite-monitored platform transmitter terminal (PTT) radio transmitter to better monitor unpredictable movements during migration. The value of the PTT lies primarily in documenting gross movements outside our state. However, they may also aid in following dispersal within Wisconsin that occurs outside the central Wisconsin restoration area. These transmitters can locate a bird within 15-1,000 m of its location. Programming PTT transmission schedules for each unit can maximize their life expectancy (~750 hours, with 8 hours of operation on each pre-defined transmission day).

6.6 BIRD INTERVENTIONS

Capture of released whooping cranes is sometimes necessary to replace nonfunctioning radio transmitters, to retrieve and relocate birds from undesirable locations, or for veterinary assessment. Capture and relocation decisions should be mediated by the following factors:

1. Increased effort required to capture and transport older, more wary birds over younger birds that are still attracted to the crane costume
2. Difficulty of capturing whooping cranes consistently associating with sandhill cranes
3. Evaluation of the subject bird's written history
4. Logistic feasibility of capturing and relocating birds with available staff and resources

6.6.1 Relocation Options

For migration training to be considered successful, the cranes must return to Wisconsin or other nearby areas in the northern part of the southern U.S.-to-Wisconsin migration Flyway (i.e., northern Illinois). Under certain conditions, retrieval and relocation of released whooping cranes may be necessary to reinforce learning and use of the same, safe migration route, especially during their first spring migration. Capture and relocation may also be used to reinforce safe habitat use; to avoid habituation to people; or to encourage normal social behavior, pairing, and reproduction. Specifically, birds may be considered for capture and relocation to central Wisconsin under the following conditions:

1. When blocked by physical barriers during their first spring migration (e.g., Lake Michigan). For returning yearlings the recommended relocation date will vary from May 15 to July 31, and is dependent upon the probability of the birds circumventing the barrier.
2. When alone or in a small group that is significantly off course (e.g., greater than 200 miles) for more than two weeks during their first spring migration. Recommended dates of relocation vary from May 1 to June 1, depending on the likelihood of the birds returning on their own. Birds shortstopping within the migration corridor at latitude 41 degrees or greater are considered on-course.

3. After establishment of a multi-year pattern of summering and wintering in an area separate from other whooping cranes. In this case relocation could be coordinated with a routine capture required for transmitter replacement.
4. After removal from the wild for temporary captivity (i.e., medical treatment), and after receiving medical clearance for release.
5. When located in an area where their health or safety is threatened, such as roosting outside of wetland areas or spending excessive time near roads.
6. When consistently in close proximity to and becoming habituated to people (e.g., where they allow or ignore human approach within 30 m or where people intentionally feed them).

Conditions numbers four through six also apply to retrieval and relocation on the migration route and wintering areas. Locations which are significantly off course may need to be defined and addressed in the future. Retrieval decisions may be impacted by the difficulty or inability to monitor birds in certain locations. Bird dispersal after return to the core reintroduction area in central Wisconsin may require attention on a case-by-case basis.

6.6.2 Methods

Capture techniques are consistent with the *Guidelines for Field Capture and Safe Handling of Whooping Cranes to Avoid Capture-Related Stress and Injury* (Appendix 4). Juvenile and sometimes older isolation-reared whooping cranes can be approached and grabbed or guided into a transport box by costumed handlers (Fig.11). These birds will approach a costumed handler near a corn-baited feeding apparatus, familiar from their pre-release days as chicks.



Figure 11. Wild costume-reared birds baited for capture

However, many older birds will not allow close approach. Possible capture techniques for older cranes include leg nooses and clap traps. Nooses were not effective with sandhill cranes at Necedah NWR; clap traps hold more promise and may be explored

further. Standard methods (i.e., rocket-netting or drugging with alpha-chloralose) used for capturing sandhill and whooping cranes in natural populations are not approved for EMP whooping crane capture because of the risk of injury or mortality. One technique developed by WCEP monitoring personnel is costumed drive-trapping for one or more cranes as described below.

1. A favorite site is identified and baited with ear corn. Ear corn is more conspicuous and attractive than shelled or cracked corn, and can be easily manipulated by personnel at the trap site. The trap site may be at a roost or daytime foraging area. However, the trap is more easily set up and maneuvered on a dry site during a capture attempt.
2. After the crane consistently uses the bait site but while it is absent, a 14' wide x 20' deep x 6.5' high portable trap is erected. For example, the trap might be set at a feeding site while the birds are on roost. The trap consists of a 0.5" electrical conduit frame covered with Bird-X netting. One end of the trap consists of two 7' wide doors which open outward to funnel birds into the trap (Fig. 12). Set up requires one through four hours depending on terrain and available personnel.
3. Once the crane becomes accustomed to the trap's presence, costumed personnel carefully attract and guide the birds to the trap entrance. When the birds are positioned in the gateway, costumed personnel move quickly towards them, ushering them through the entrance. The gates are closed and the birds are carefully grabbed and hooded. If the capture is for transmitter replacement, the nonfunctional transmitter is replaced and the bird is released on site. If the capture is for retrieval and relocation, personnel continue to the next step.
4. With hoods removed the birds are placed in cardboard transport boxes.
5. An air-conditioned van arrives and the boxes are loaded into the van.
6. For a short relocation (i.e., a few hours of driving), the birds are transported in the van. For long distances, the birds are transported by van to the nearest suitable airport, transferred to a waiting aircraft, and flown to an airport near the release site.
7. Upon arrival, the boxes are loaded into a waiting air-conditioned van and driven to a prearranged site for medical examination. After examination, the birds are transported to the release site.
8. Boxes are unloaded with the sliding doors facing away from the vehicle. The doors are pulled, and the van quickly leaves as the birds exit the boxes. Alternately, the vehicle leaves the area and costumed personnel release the birds after the vehicle is out of sight.



Figure 12. Portable crane trap

6.6.3 NESTING INTERVENTIONS

Successful nesting is crucial to the restoration of a self-sustaining eastern population of whooping cranes. The process of rearing and training cranes for release is labor intensive and costly. At times, human intervention may be needed to avert undesirable reproductive outcomes. Such intervention could include egg removal to prevent exposure or predation, or egg swapping to increase the chance of success for more genetically valuable eggs.

Nest intervention can disturb adult breeding cranes. With guidance from the WCEP Project Direction Team as warranted, field staff will need to exercise their best judgment when making decisions in the field. Circumstances which may warrant nest intervention include preventing reproduction by genetically similar birds, averting interspecies pairing, and rescuing eggs.

Specifically, intervention may be needed to prevent reproduction by full sibling pairs. Several intervention options are available. If the birds demonstrate an ability to be successful parents, it may be desirable to allow them to raise young by swapping their eggs with more genetically desirable eggs. An alternative but more drastic action may be to remove one sibling to encourage the other to pair with an unrelated bird.

Interspecies pairing with sandhill cranes may warrant immediate intervention. No hybrid chicks have been documented in the AWBP. Florida Fish and Wildlife Conservation Commission biologists monitor associations with sandhill cranes, but have had limited success with moving birds to break up a whooping crane/sandhill crane pair. To date, there have been 15 FP whooping cranes that have associated with sandhill cranes rather than whooping cranes. Of these 15 birds, there have been two whooping crane/sandhill crane pairs documented. It is possible that one pair hatched two chicks,

but they did not survive long enough to verify whether the chicks were the result of the hybrid pair (M. Folk, personal communication, September 2006).

If ever a female EMP whooping crane pairs with a male sandhill, it may be best to capture and relocate the female to an area with whooping cranes. However, in the case of a male whooping crane paired with a female sandhill, the female should be removed since a male would more likely return to its territory after relocation.

Another intervention may involve removing eggs that could succumb to exposure or predation. Young birds, in particular captive-reared birds, are expected to be less proficient parents during their initial nesting attempts. Cranes normally break for short periods as the parents exchange incubation duties; stand to stretch, preen, or drink; or turn eggs. Based on observations of Florida nesting cranes, such routine breaks can vary from 5 to 20 minutes. However, the adults should always be in sight of the nest.

Nest abandonment may occur anytime between egg laying and late incubation. For example, during late incubation flooding can lead to nest abandonment. When feasible, it is highly recommended that the rescued egg be replaced with a wooden egg. If the adults return to the nest, the fake egg might encourage the cranes to begin incubation—thus learning correct incubation behavior.

Egg collection should occur whenever both adults are off their territory and out of sight for more than two hours. Nevertheless, the time interval may be as short as one hour depending on 1) the behavior and nesting history of the adult pair, 2) the length of time after the egg was laid, 3) the weather, 4) the genetic value of the egg(s) 5) whether darkness is approaching or evidence that the adults are roosting elsewhere. The egg's age in combination with the ambient temperature will determine how long the egg can remain unattended before the embryo is harmed (Table 2). An un-incubated egg can remain unattended for a longer period of time than an incubated egg.

Table 2. Embryo viability.

Ambient temperature	Elapsed time before embryo harm
<4 ° C	45 minutes
4-16 ° C	3-4 hours
16-27° C	1-2 hours
27-32° C	2 hours
>32 ° C	45 minutes

Removed eggs should be handled with plastic gloved hands, placed in an egg box warmed to 34.4 ° C, and carefully transported to a facility with an appropriate incubation program. If the ambient temperature is < 4 ° C, it is better to let the egg warm up to room temperature before placing it in the egg box.

Decisions guiding egg return to a nest should be determined on a case-by-case basis. Consideration should include genetics of the egg, disturbance to adult pair, and length of time the pair has been incubating. The egg might be placed back in the nest if the

parents return to the site and appear interested. Based on parental attention, natural incubation in the nest might then be allowed to continue. (Related information is located under Population Recommendations, Section 6.3.3, and Nest Site and Territory Management, Section 6.9)